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REMARKS

Claims 11, 12 and 14 and 15 have been amended to correct informalities without being narrowed. Claims 1-10 and 13 are presented for reconsideration without amendment in the light of the following authorities and remarks. Such amendments to claims are only for the purpose of expediting the prosecution of this application and are not to be construed as an abandonment of any of the novel concepts disclosed therein.

3-8. Claims 1-4, 8, 9 and 11 are objected to because the Examiner urges that "and" should be changed to --or-- because the threshold frequency can not be less and more than the received frequency at the same time. This objection is respectfully traversed. The claims call for "tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively." This language means that when the received frequency is above the threshold frequency, the oscillator of the receiver is tuned to a frequency within the range of reception frequencies that is less than the received frequency and when the received frequency is below the threshold frequency, the oscillator is tuned to a frequency within the range of reception frequencies that is above the threshold frequency. Thus the receiver oscillator is always tuned to a frequency within the predetermined range of reception frequencies and when the received frequency is above the threshold frequency, the local oscillator frequency is less than the received frequency and when the received frequency is below the threshold frequency, the local oscillator frequency is above the received frequency, but at all times being a frequency within the predetermined range of reception frequencies.

The result of this invention is that there is no local oscillator radiation outside the predetermined range of frequencies.

This application was filed on July 29, 1999, underwent four office actions and never received a suggestion in any of them regarding changing "and" to -- or --. Accordingly, withdrawal of the objection to claims 1-4, 8 and 9 is respectfully requested.

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9. Claim 11 is objected to because in line 8 " a local oscillator, for providing a local oscillator signal" should be deleted. The claim has been amended without being narrowed.

10. The office action states:

10. Claims 1-11, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belisomi U.S. Patent 4,142,158 in view of Skerlos U.S. Patent 4,163,259.

Regarding claim 1, a television or radio receiver having electronic means for selecting the frequency to which the receiver is to be tuned, in which the selection is effected by means of a voltage controlled oscillator controlled by a control loop.

Referring now to FIG. 1 of the drawings, in column 3, lines 10-25, there are shown the main blocks of the device for tuning a television receiver to a selected channel. This device comprises an voltage controlled oscillator 1 the frequency of which can be controlled by applying a control voltage to a control terminal 3, and which supplies to a first output terminal 2 a persistent oscillation which is fed to a mixing circuit of conventional type (not shown in the drawing). In light of the foregoing teachings, the receiver receives an electromagnetic signal having a frequency tuned to the selected frequency.

In column 3 line 65 via column 4 line 30, depression of one of the keys of the keyboard 14 recalls from the memory a number corresponding to the channel selected by that or those keys, and this number is fed as a control signal to the programmable divider 6 to control this to divide the signal generated by the voltage controlled oscillator 1 and already divided down by the divider 5, by a given number which is such that the frequency of the reference signal from the oscillator 9, multiplied by this number, corresponds, to a factor, to the nominal frequency of the chosen channel. The output voltage from the comparator 8 then controls the control loop to cause the frequency of the signal from the programmable divider 6 to coincide with the reference frequency, thereby ensuring the perfect tuning of the receiver to the required channel. In light of the aforementioned teachings, the frequency of the reference signal from the oscillator 9 corresponds to the claimed "threshold frequency" and the output from programmable divider 6 corresponds to the claimed "desired received signal". The frequency comparator 8 performs the comparison step of the desired received signal to a threshold frequency as claimed in the patent application.

Belisomi does not teach tuning the oscillator of the receiver to a frequency within the range of reception frequencies based on the threshold frequency, that is less and more than the received frequency when the received frequency is above and below the threshold frequency, respectively as claimed in the application claim.

Skerlos teaches a "window" type channel tuning system for use in television receiver, wherein the receiver is automatically tuned to a restricted

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frequency "window" about the nominal carrier frequency of the desired channel; see column 1, lines 15-30 and column 2, lines 5-15. In light of the foregoing disclosure, the frequency "window" corresponds to the claimed "frequency range" and the nominal carrier frequency of the desired channel corresponds to the claimed "threshold frequency". In column 3, lines 40-65, Skerlos discusses a conventional technique in which Skerlos teachings are relied on for tuning accuracy. In conventional television receivers, the frequency of the IF signal can be used as an indication of receiver tuning accuracy. Specifically, the frequency of the IF signal is 45.75 MHz when the tuner is accurately tuned to the carrier frequency of a received television signal. Any deviation from proper tuning results in the frequency of the IF signal deviating from this nominal frequency. In view of that, it would have been obvious for one of ordinary skill in the art at the time of the invention that Belisomi receiver can be modified to track the frequency of the IF signal is 45.75 MHz as taught in the conventional television receivers. Motivation is that tracking and using the received IF frequency as a tuning indication is known much more accurate.

According to the aforementioned conventional technique, any deviation from proper tuning results in the frequency of the IF signal deviating from this nominal frequency, which is the frequency of reference signal. In view of that, the frequency of the IF signal, e.g. 45.75 MHz, corresponds to the frequency of reference signal. Tuning occurs when the frequency of the IF signal deviating from this nominal frequency respectively.

Regarding claim 2, claim 2 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, referring to Belisomi invention, in column 3 line 55 via column 4 line 15, memory 7 stores all the numbers corresponding to desired channels. In view that, the desired received channel is converted to an index number as claimed in the application claim.

Regarding claim 3, claim 3 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, Belisomi does not teach "further representing the threshold frequency as an index value of a set of index values as set forth in the claim. However, because the desired received channels are stores in the memory 7 as index values, it would have been obvious for one of ordinary skill in the art at the time of the invention that the frequencies of the reference signal can be modified to be represented as index values. Motivation is that by representing the frequencies of the reference signal as an index value, the reference oscillator 9 does not have to generate various high frequencies. The oscillator 9 only need to generate one single frequency and use the index value to convert it back to the desired frequency of the reference signal.

Regarding claim 4, as recited in claim 1, any deviation from proper tuning results in the frequency of the IF signal deviating from the reference frequency. Deviation from the reference frequency results in frequency offset, which can be

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correct by tuning, e.g. adding/or subtracting frequency offset, oscillator 1.
Deviation from the reference

frequency corresponds to the claimed "greater than and less than the threshold frequency".

Regarding claim 5, as recited in claim 1, Skerlos teaches a "window" type channel tuning system for use in television receiver, wherein the receiver is automatically tuned to a restricted frequency "window" about the nominal carrier frequency of the desired channel. In view of that, the restricted frequency "window" corresponds to the frequency range around the center frequency, corresponding to the nominal carrier frequency of the desired channel. The range of frequency is bounded by F_{low} and F_{high} and the center frequency would be equal to $(F_{high} - F_{low}) / 2 + F_{low}$ respectively. In view of that, frequency offsets from the nominal carrier frequency of the desired channel includes offsets with the same magnitude.

Regarding claim 6, similar to claim 5, for tuning to the nominal carrier frequency of the desired channel, e.g. center frequency, the frequency offsets are less than or equal to $(F_{high} - F_{low}) / 2$, e.g. IF frequency of 45.75 MHz as taught in the conventional television receivers.

Regarding claim 7, according to the conventional television receivers and with "window" type channel tuning system as taught by Skerlos, the frequency offsets (e.g. around the center frequency) are equal to the IF frequency.

Regarding claim 8, claim 8 is rejected on the same ground as for claim 6 because of similar scope.

Regarding claim 9, claim 9 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, Skerlos teachings apply to UHF and VHF receiver. The range of frequencies as claimed in the application claim is within UHF band that covers from 2300 MHz to 2900 Mhz. Regarding claim 10, claim 10 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, oscillator 1 corresponds to the claimed local oscillator, keyboard 14 corresponds to the claimed source of a signal as set forth in the claim. In column 2, lines 15-40, the control loop is for controlling the output frequency of oscillator 1, the control loop as taught in Belisomi corresponds to the claimed frequency controller.

Regarding claim 11, claim 10 is rejected on the same ground as for claim 1 because of similar scope. Furthermore, as recited in claim 1 of Belisomi invention, the receiver in figure 1 comprises an voltage controlled oscillator 1 the frequency of which can be controlled by applying a control voltage to a control terminal 3, and which supplies to a first output terminal 2 a persistent oscillation which is fed to a mixing circuit of conventional type (not shown in the drawing). In view of that, figure 1 inherently includes a signal path for receiving a signal, and a mixer coupled to oscillator 1 as claimed in the application claim.

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Regarding claim 13, claim 13 is rejected on the same ground as for claim 11 and further in view of claim 9 because of similar scope. Pp. 4-10.

This ground of rejection is respectfully traversed.

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

"Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, '[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.'" *In re Laskowski*, 10 U.S.P.Q. 2d 1397, 1398 (Fed. Cir. 1989).

"The claimed invention must be considered as a whole, and the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984).

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so." *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (emphasis in original, footnotes omitted).

"The critical inquiry is whether 'there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. [citing *Lindemann* with emphasis added.]" *Fromson v. Advance Offset Plate, Inc.*, 225 U.S.P.Q. 26, 31 (Fed. Cir. 1985).

As the Federal Circuit Court of Appeals said in *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999):

Close adherence to this methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one 'to fall victim to the insidious effect

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of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.'

And in *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1316 (Fed. Cir. 2000), the Court said:

[I]dentification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. *See id.* [*Dembiczak*]. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *See In re Dance*, 160 F.3d 1339, 1343, 48 U.S.P.Q.2d 1635, 1637 (Fed. Cir. 1998), *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. *See B. F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2d 1314, 1318 (Fed. Cir. 1996).

Superheterodyne receivers have been known for decades. In a superheterodyne receiver, a mixer has a received signal input for receiving input radio frequency signals and a local oscillator input for receiving a local oscillator signal of a frequency that is varied to select a signal of a desired radio frequency by beating the local oscillator signal with the desired signal to produce a difference frequency signal of intermediate frequency that is amplified by the intermediate frequency amplifier. The local oscillator signal in a superheterodyne receiver that have been known for decades is either above or below the frequency of the desired input signal within a predetermined range of frequencies, such as the AM and FM broadcast bands. Thus, for at least a significant range of desired input signal frequencies, the frequency of the local oscillator signal is outside this predetermined range of frequencies. For example, for the FM broadcast band, the intermediate frequency for most FM receivers is 10.7 MHz., and the local oscillator is tunable from 98.7 MHz to 118.7 MHz. to receive signals within the FM broadcast band of 88 to 108 MHz. Thus, local oscillator radiation can occur outside and above the FM Broadcast band which is within the VHF omnirange VOR frequencies of 108 MHz. to 117.95 MHz. used for aircraft navigation that could interfere with receiving air navigation signals if operated on an aircraft, and an FM radio is not an approved electronic device for operation by a passenger on a commercial aircraft.

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The claimed invention always maintains the local oscillator frequency within the predetermined frequency range embracing potential desired input signals. Thus, an FM receiver for receiving signals within the FM Broadcast band incorporating the invention would have the local oscillator in that receiver always at a frequency within 88 to 108 MHz and produce no interference outside this band.

Nothing in the references discloses the claimed invention or suggests the desirability of combining what is there disclosed to meet the limitations of the claimed invention.

The Examiner states that "the reference signal from the oscillator 9" of the primary reference is the same as the threshold frequency in the rejected claims because the threshold frequency recited in the rejected claims is a fixed frequency that is necessarily restricted to being within the predetermined frequency range. There is no disclosure in the primary or secondary reference of maintaining the local oscillator within the range of reception frequencies.

It is impossible to combine the primary and secondary references to meet the limitations of the rejected claims. "Moreover, we observe that even if these references were combined in the manner proposed by the examiner, that which is set forth in appellant's claims . . . would not result." *Ex parte Bogar*, slip op. p.7 (BPA&I Appeal No. 87-2462, October 27, 1989). "Even if we were to agree with the examiner that it would have been obvious to combine the reference teachings in the manner proposed, the resulting package still would not comprise zipper closure material that terminates short of the end of the one edge of the product containing area, as now claimed." *Ex parte Schwarz*, slip op. p.5 (BPA&I Appeal No. 92-2629 October 28, 1992). "Although we find nothing before us indicating why it would be desired to combine the references in the manner urged by the examiner, it is clear to us that such a modification by itself would not result in that which is set forth in the claims." *Ex Parte Kusko*, 215 U.S.P.Q. 972, 974 (BPA&I 1981). That it is impossible to combine the primary and secondary references to meet the limitations of the rejected claims is reason enough for withdrawing the rejection of them.

If this ground of rejection is repeated, the Examiner is respectfully requested to quote verbatim the language in each reference regarded as corresponding to the limitations in each

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rejected claim, and quote verbatim the language in the references regarded as suggesting the desirability of combining what is there disclosed to meet the limitations of the rejected claims.

The office action states:

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belisomi U.S. Patent 4,142,158 and Skerlos U.S. Patent 4,163,259 and further in view of Sato et al. U.S. Patent 4,021,752. Belisomi and Skerlos do not teach the local oscillator further comprises a phase locked loop as claimed in the application claim.

In column 2, lines 1-20, according to one aspect of Sato et al. present invention, a local oscillator may be used with a PLL that comprises the local oscillator whose frequency is changed within a predetermined frequency range. Referring to figure 1, a voltage-controlled variable frequency oscillator is used as the local oscillator 4 to produce an oscillation signal in response to the frequency of the received signal and to supply that signal to the mixer 3 and to a variable frequency divider 9. The signal obtained from the variable frequency divider 9 is applied to a phase comparator 10, which also receives a signal from a reference oscillator 11 via a fixed frequency divider 12. The phase comparator 10 compares the phases of the signals from the variable frequency divider 9 and the fixed frequency divider 12 and produces a signal based on the phase difference. This signal is then applied through a low pass filter 13 to a DC amplifier 14. The output signal from the DC amplifier 14 is applied to the local oscillator 4 as a frequency-controlling signal. The PLL includes phase comparator 10, a reference oscillator 11 via a fixed frequency divider 12, a low pass filter 13 to a DC amplifier 14. The local oscillator, corresponding to the claimed local oscillator, includes local oscillator 4 and the PLL as discussed above. Belisomi, Skerlos, and Sato et al. are in the same field of endeavor. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention that Belisomi local oscillator in the receiver can be modified to implement the local oscillator as taught by Sato et al. Motivation is that as discussed in Sato et al. invention, the PLL circuit and FM feedback are combined to suppress the drift in the local oscillator and to improve the sensitivity of the receiver. Pp. 10-11.

This ground of rejection is respectfully traversed. Claim 12 is dependent upon and includes all the limitations of claim 11, and the reasoning in support of the patentability of claim 11 over the primary and secondary references is submitted to support the patentability of claim 12 so that further discussion of the tertiary reference is submitted to be unnecessary.

The final action states:

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12. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belisomi U.S. Patent 4,142,158 and Skerlos U.S. Patent 4,163,259 and further in view of Kuo et al. U.S. Patent 5,307,515.

Regarding claim 14, claim 14 is rejected on the same ground as for claim 11 because of similar scope. Belisomi and Skerlos do not teach the frequency controller further comprises a microprocessor as claimed.

Kuo et al. invention is directed to a radio receiver with less susceptibility to adjacent channel interference. In figure 1, column 2 line 64 via column 3 line 10, a conventional receiver includes an antenna 10 connected to a radio frequency (RF) amplifier 11. An RF signal is output from RF amplifier 11 and mixed in a mixer 12 with a mixing signal f_o from a phase-locked loop local oscillator 13. The frequency of mixing signal f_o is controlled by a microcontroller 14, in response to an external tuning input, and frequency-shifts a desired RF signal from RF amplifier 11 to the intermediate frequency (IF) of the receiver. Belisomi, Skerlos, and Kuo et al. invention are in the same field of endeavor. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention that Belisomi receiver can be modified to implement a microcontroller for frequency control as taught by Kuo et al.. Motivation is that the microcontroller provides speed and more accuracy. Regarding claim 15, since the microcontroller is part of the frequency controller, as appreciated by one of ordinary skill in the art, the microcontroller can be implemented to store computer instructions for adding or subtracting frequency offsets depending on which way the received IF frequency deviates from the frequency of the reference signal. Pp.12-13.

This ground of rejection is respectfully traversed. Claim 14 includes the limitation that the frequency controller provides a frequency control to the local oscillator that always sets the frequency of the local oscillator to a frequency that differs from that of a received signal within the predetermined frequency range by the intermediate frequency and is within the predetermined frequency range, limitations absent from the primary, secondary and tertiary references. Accordingly, withdrawal of the rejection of claims 14 and 15 as unpatentable over these references is respectfully requested. If this ground of rejection is repeated, the Examiner is respectfully requested to quote verbatim the language in the references regarded as corresponding to the limitation in at least the four-line subparagraph of claim 14, and quote verbatim the language in the references regarded as suggesting the desirability of combining what is there disclosed to meet the limitations of these rejected claims.

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In view of the forgoing authorities, remarks and the inability of the prior art, alone or in combination, to anticipate, suggest or make obvious the subject matter as a whole of the invention disclosed and claimed in this application, all the claims are submitted to be in a condition for allowance, and notice thereof is respectfully requested. If the Examiner believes this application is not in a condition for allowance, he is respectfully requested to telephone the undersigned attorney at 617-521-7014 to discuss what additional steps he believes are necessary to place the application in a condition for allowance.

Please apply any charges or credits to deposit account 06-1050, Order No. 02103-349001.

Respectfully submitted,
FISH & RICHARDSON P.C.

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